

INCH POUND

MIL-T-5041H

13 March 1989

SUPERSEDES

MIL-T-5041G

12 SEPTEMBER 1975

MILITARY SPECIFICATION

TIRES, PNEUMATIC, AIRCRAFT

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for aircraft pneumatic tube-type and tubeless tires.

1.2 Classification. Tires for aircraft main and auxiliary wheels shall be assigned a size designation based on maximum new tire inflated outside diameter, cross-sectional width and rim bead seat diameter as designated in the following examples:

17.5 x 6.25-6
37 x 13.0-16
H44.5 x 16.5-20
B24 x 9.5-10.5

1.2.1 In establishing new tire size, the following size increments shall apply:

- a. Outside diameter (maximum) - 0.50 inch
- b. Cross-sectional width (maximum)
 - Up to 10 inches - 0.25 inch
 - 10 inches and over - 0.50 inch
- c. Bead seat diameter - 1.00 inch

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Ogden ALC/MMEDO Hill Air Force Base, Utah 84056-5609 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC NO.

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FSC 2620

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

(See Supplement 1 for list of associated specifications.)

STANDARDS

FEDERAL

FED-STD-601 Rubber; Sampling and Testing

MILITARY

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes
 MIL-STD-129 Marking for Shipment and Storage
 MIL-STD-698 Quality Standards for Aircraft Pneumatic
 MS 14113 Tape, Identification, Color Coded, for Aircraft
 Tires
 MIL-STD-87B Method of Dimensioning and Determining Clearance
 for Aircraft Tires and Rims.

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.1.2 Other Government documents, and drawings. The following other government documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

Federal Aviation Administration Specification

TSOC62C Tire - Aircraft, 26 x 6.6
 TSOC62C Tire - Aircraft, 46 x 16

(Copies of specifications, standards and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other Publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 746-73. Brittleness Temperature of Plastic and Elastomers by Impact

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

GD 16VL027	Tire - Aircraft, 18 x 5.7-8
GD 16VL028	Tire - Aircraft, 23.5 x 8.0-14
L 194C2003	Tire - Aircraft, 35 x 11.5-22
L 194C2025	Tire - Aircraft, 46 x 16-23.5

"(Application for copies should be addressed to the contracting activity or as directed by the contracting activity)."

"(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in our libraries, or through other informational services.)"

3. REQUIREMENTS

3.1 Qualification. The tire furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

3.2 General requirements. Unless otherwise specified, tires shall be suitable for use on military aircraft, on all types of improved and unimproved runways and on aircraft carrier decks, under all conditions of weather, and within the temperature range specified herein.

3.3 Materials. Materials shall conform to applicable specifications and to the requirements specified herein. The materials used in the manufacture of aircraft tires shall be of a quality that will meet the performance requirements specified either herein and on the applicable MS standards or drawings, or both. The compounds used shall be suitable and properly vulcanized in order to age without failure under the specified service conditions specified in the contract.

3.3.1 Conductive material. All aircraft tires shall be constructed of materials that will cause the dissipation of static electricity into the ground.

3.4 Design and construction. Design and construction shall conform to the requirements specified herein and on the applicable MS standard or drawing. For all GFAE tires which are specifically identified by drawing or MS standard number, the drawing or MS standard requirements shall take precedence over MIL-T-5041.

3.4.1 Tire characteristics. The size, construction and weight characteristics of the tires shall conform to the requirements specified in table 1.

3.4.1.1 Helicopter applications. The load rating and inflation factors for helicopter tire use shall be as follows:

3.4.1.1.1 Load rating. The load rating of aircraft tires, when used for helicopter applications, shall be obtained by multiplying the aircraft tire static and dynamic load ratings by a factor of 1.5.

3.4.1.1.2 Tire inflation. The tire inflation pressure at helicopter rated load shall be 1.50 times the aircraft tire rated inflation with a maximum allowable inflation of 1.80 times the aircraft tire rated inflation pressure, or 45 percent of the specified aircraft tire burst pressure, whichever is less.

3.4.1.1.3 Tire dimensions. The increase in dimensions allowed when the inflation pressure increase is 1.80 times above normal aircraft tire

inflation, shall not exceed 4 percent in section height, section width and shoulder dimension.

3.4.1.1.4 Tire speeds. The tire shall have a velocity capability of 60 knots at helicopter rated load and inflation pressure.

3.4.1.2 Tubeless tires - bead width. The bead width of tubeless tires shall not exceed by more than 0.15 inch, the values specified for the same size and ply rating of tube-type tires, excluding the bead toe flash, and shall be limited so as not to cover the inflation source hole in the application wheel.

3.4.2 Tire dimensions. The dimensions of inflated tires shall conform to the requirements specified in Table II. All lettering and decorative ribs and designs shall be included in these dimensions. Tire dimensions shall conform to the requirements of MIL-STD-878 And figure 4 of this specification.

3.4.3 Rim dimensions. Tires shall be designed and constructed to fit the rims as specified on the applicable Military Standard or Air Force drawing. If a MS or AF drawing does not exist, the rim shall conform to the Specification Control drawing or to the one recommended by the Tire and Rim Association.

3.4.4 Tire dimensioning. Tire dimensioning shall comply with the requirements of MIL-STD-878 and 1.2 of this specification.

3.4.5 Tread

3.4.5.1 Tread pattern. The tread pattern shall be ribbed tread pattern unless otherwise specified on the applicable MS or AF drawing.

3.4.5.1.1 Rib-tread configuration. The tread pattern shall be a rib tread having a minimum of five grooves for tires having a cross-section width greater than 11.50 inches, and a minimum of three grooves for tires having a cross-section width of 11.50 inches or less. The grooves shall be continuous, circumferential, and have an uninterrupted mold skid depth as specified in Table I unless otherwise specified.

3.4.5.2 Underskid thickness. The thickness of the material between the carcass and the bottom of the tread pattern shall not be less than 30 percent of the actual mold skid depth (wear depth indicators are not considered to be part of the tread pattern). On tires which are to be retreaded, the retread buff line (RBL) shall be a definitive, continuous, circumferential layer of uninterrupted rubber .060 inch minimum thickness extending shoulder to shoulder in the finished tire. It shall be located in the undertread area of the tire between the last carcass ply and the base of the tread grooves. Reinforcing material such as breakers and fabric tread plies may also be located in the undertread area, but shall not interrupt a RBL.

3.4.5.3 Skid depth. The mold skid depth (see 6.4.3) shall be measured as close to the centerline of the mold as possible.

3.4.5.4 Fabric reinforced tread (see 6.4.4). Reinforcing material must be proven satisfactory for aircraft tire use as specified in 4.5.7.

3.4.5.5 Fabric tread (see 6.4.5). Fabric material must be proven satisfactory for aircraft tire use as specified in 4.5.7.

3.4.6 Sidewall. The sidewall shall be of a sufficient gauge as to protect the carcass against abrasion and weathering during its carcass life.

3.4.6.1 Venting

3.4.6.1.1 Tube-type tires. All tires with inflation pressures greater than 100 pounds per square inch (psi) shall be suitably vented to prevent blistering. There shall be at least eight vents per sidewall located above the wheelrim flange. All ventholes shall be marked with an aluminum or white dot. Where air-bleed ridges or grooves are molded into the bead face and inner surface of tires, ventholes and markings will not be required.

3.4.6.1.2 Tubeless tire. Tubeless tires shall be suitably vented to prevent blistering. All ventholes shall be marked with a bright green dot. Ventholes shall not penetrate the inner liner of the tire.

3.4.7 Bead

3.4.7.1 Bead fit. Without using a lubricant on either bead or rim, the inflated pressures specified in Table III shall be required to accomplish the initial seating of all tire beads on the rim ledge of a wheel having a contour in accordance with the applicable MS or AF drawing.

3.4.8 Chafing resistance. The bead shall be so protected as to prevent chafing of the tire in the rim area under operating conditions. The protecting material in tubeless tires shall not leak air or nitrogen.

3.4.9 Colored wear indicators. Colored wear indicators, when required, shall be in accordance with the applicable drawing or MS.

3.4.10 Cut-limit dimensions. Cut-limit dimensions shall be shown on the tires in accordance with 3.8.2.2 and figure 1. The cut-limit dimensions shall be equal to the distance from the bottom of the tread groove which is closest to the outermost carcass ply (centermost tread groove in most cases) to a depth to be determined as follows:

MIL-T-5041H

Tires Rated 139 Knots and Below

Tires Rated 140 Knots and Above.

<u>No of Carcass Plies in Tire</u>	<u>No of Carcass Plies That can be Cut</u>	<u>No of Carcass Plies in Tire</u>	<u>No of Carcass Plies That Can Be Cut</u>
2	0	2	0
4	1	4	0
6	1	6	1
8	2	8	1
10	3	10	2
12	3	12	2
14	4	14	2
16	5	16	3
18	5	18	3
20	6	20	4
22	7	22	4
24	7	24	4
26	8	26	5
28	9	28	5
30	9	30	6

The cut-limit dimensions shall be expressed in 1/32 of an inch and shall be rounded to the next smaller 1/32 of an inch increment when a fraction of a 1/32 inch is involved.

3.4.11 Retreadability. Tires shall be designed and manufactured so that the carcass structure, innerliner, sidewall, beads and bead seat cover will be satisfactory for repeated retreading.

3.5 Performance. The tires shall meet the following performance requirements when tested in accordance with the applicable tests in section 4.

3.5.1 Wheel/Tire slippage. Mounted tires shall show no evidence of slippage on the wheel rim that would damage the tube or valve in tube type tires or the air seal of tubeless tires.

3.5.2 Low temperature. All tire compounds shall withstand a temperature of -50°C (-58°F).

3.5.3 Air retention - tubeless tires. The air pressure loss in tubeless tire assemblies shall not exceed 5 percent of rated pressure during any 24-hour period after the 12-hour stretch period. The tire shall show no evidence or appearance defects, such as sidewall blisters, tread separation, etc.

3.5.4 Tire loaded radius. The tire manufacturers shall report the actual loaded radius of the test tire at rated load and inflation pressure with the permissible tolerance on the nominal loaded radius.

3.5.5 Balance. Tires shall be balanced, when not inflated, with tolerances as specified in Table I. Out of tolerance may be corrected by utilizing balance pads affixed to the inside of the tire. Pads shall be removable without injuring the carcass or inner liner material. The pads shall be such that they will not chafe the innertubes. Adhesion values shall be as follows: 8 pounds minimum for tubeless tires and 1-1/2 pounds minimum for tube-type tires.

3.6 Age. Tire shall be not more than 12 months old from the date of manufacture to the date of delivery.

3.7 Trimming. The bead toes of all tires to be used on tube type applications shall be inspected for excessive toe flash or sharp edges which could cut or chafe the tube. Irregular toes or toe flash exceeding .3 inch must be trimmed. If trimming the bead toe results in a sharp edge, the edge must be buffed to a smooth contour. Carcass plies are not permitted to be cut during trimming or buffing.

3.8 Product identification and marking

3.8.1 Balance marker. A balance marker consisting of a red dot shall be branded or stamped into the sidewall of the tire immediately above the bead to indicate the lightweight point of the tire. This marking shall last through one service life of the tire.

3.8.2 Identification of product. Except as otherwise specified, the following information, as applicable, shall be engraved or embossed on the tires. Markings on the tire sidewall shall be located so they will not be removed during buffing for retreading, excluding sidewall veneer.

- a. Size.
- b. On tubeless tires, add TUBELESS.
- c. Ply rating (PR is permissible).
- d. Date of manufacture and serial number in accordance with 3.8.2.1.
- e. Manufacturers name or trademark, or both (to be located by the manufacturer).
- f. Cut-limit dimension in accordance with 3.4.10 and 3.8.2.2.
- g. All tires with a colored wear indicator ply shall be identified with the letters RC.
- h. Country of manufacture (if other than USA).
- i. Manufacturer's mold number.

- j. Tires with a fabric tread shall be marked FABRIC TREAD.
- k. National stock number in accordance with 3.8.2.3.
- l. Manufacturer's qualification test report (QTR) number, prefixed by letter, "QTR".
- m. Color dots for ventholes (see 3.4.6.1.1 and 3.4.6.1.2).
- n. Additional markings as required by applicable MS or AF drawings.

3.8.2.1 Date of manufacture and serial number. The date of manufacture of the tire shall be included in the serial number of the tire. The serial number shall consist of a maximum of 10 positions. The first four positions shall be the date of manufacture in the form of a julian date (last digit of the year followed by the day of the year, i.e., 23 May 1974 shall be written 4143). The next positions (not to exceed six) selected by the manufacture may be either numbers or letters, or a combination thereof.

3.8.2.2 Cut-limit identification. The cut-limit identification shall be molded in a neat legible manner in a minimum of two places equally spaced on each sidewall of the tire. It shall be molded so that the identification is not in the wear area of the tire as shown on figure 1.

The lettering shall be 1/4 inch in height and the diameter of the circle shall be 1 inch. (see 3.4.10.)

3.8.2.3 National Stock number. The National Stock number shall be located on one side of the tire, on the same side as the manufacturer's name. The prefix NSN shall be included. The height of the letters and the numbers shall be not less than 1/4 inch for tire sizes ranging in outside diameter up through the 26 x 6.6 tire and not less than 5/16 inch for tire sizes above the 26 x 6.6 size. The NSN stock number shall not contain dashes or spaces (example: NSN 26200XXXXXXXXX).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of tests. The inspection and testing of tires shall be classified as follows:

- a. Qualification inspection (4.3).
- b. Quality conformance inspection (4.4).

4.3 Qualification testing.

4.3.1 Qualification test samples. The qualification test samples shall consist of one tire of each construction, size, and type. The samples shall be identified as specified in 3.8.2, unless otherwise specified by contractor or Government specifications.

4.3.2 Qualification test report (QTR). The manufacturer shall prepare test reports in the general format shown on figures 2 and 3 and furnish two copies of each to the Government approving activity.

4.3.2.1 Bead-seating. If bead-seating pressure tests are conducted on steel or non-aircraft wheels, this shall be specified in the QTR.

4.3.2.2 Load deflection curves. The QTR shall be accompanied by a chart showing load-deflection curves prepared on regular lettersize (8-1/2 by 11 inches) sheets. Plotting paper shall be of the type having a minimum of 10 spaces per inch. The deflection shall be plotted in inches on the ordinate and the load on the abscissa. If larger paper is used, it shall be reduced to 8-1/2 by 11 inches.

The chart shall include the following:

- a. There shall be seven inflation pressure curves on the chart. One of these curves shall be rated inflation pressure, and three for less than the rated inflation pressure curve, in increment multiples of 5 at approximately 85, 70 and 55 percent of the rated inflation pressure. Three of the curves shall be greater than the rated inflation pressure curve and in increment multiples of 5 at approximately 115, 130 and 160 percent of the rated inflation pressure. For Navy tires a load deflection curve at carrier inflation pressures shall also be included.

- b. All inflation pressure curves shown on the chart shall have a range of from 16 percent deflection to the tire bottoming point.
- c. The following percent deflection lines shall be plotted horizontally across the inflation pressure curves based on dimensions at rated inflation pressure: 16, 20, 24, 28, 32, 35, 37, 40, 44 and 48.
- d. Load and inches of deflection scales shall be selected as follows:

200 (Spaces on Abscissa). =X
Maximum load in kips to be reported

Reduce X to the nearest multiple of 5 (but less than X) = Y.

Y = number of spaces equal to 1,000 pounds (1 kip).

Inches of deflection scale.

Subtract inches of deflection at 16 percent from inches for bottoming.

Divide the resultant inches in 150 (spaces) = X.

Reduce the quotient to the nearest multiple of 5 (but less than X) = Y.

Y = number of spaces equal to 1 inch deflection.

Note: In selecting scales, consideration should be given to ease of interpolation. When scales of 15 (or a multiple thereof) spaces per inch of deflection or per 1,000 pounds are used, then at least each 0.20 inch of deflection or 200-pound increments shall be marked with a dot or short line along the applicable axis to facilitate interpolation.

- e. The following data shall be listed in the lower right-hand corner of the load-deflection charts:

Size _____ PR

MFR

(Location of name optional)

Ref QTR NO.

Rated Static Load (lb) _____ at _____ psi

Rated Speed _____ mph

Rim Dia (in) _____ Flange Ht (in)

Flat Tire Radius (in)

Data at Rated Static Load or Inflation (or both)

OD (in) _____ Section width (in)

Shoulder Dia (in)

Shoulder Width (in)

Loaded Radius (in)

Contact Area (sq in)

Energy Capacity (Bottomed) _____ ft-lb

Bottomed Pressure _____ psi

Bottomed Load _____ lb

4.3.2.3 Footprints. Prints indicating the actual shape and total gross contact and the net contact area in square inches of the tire footprint at rated static load and inflation, shall be submitted with each QTR. The prints shall include data at rated Load and also at increments of approximately 15, 30 and 45 percent above rated load, and at increments of approximately 15, 30, 45 and 60 percent below rate load. For tires used by the Navy on carrier-based aircraft, a footprint at (bottomed) condition at carrier inflation pressure shall also be submitted. The minimum appropriate paper size for footprints shall be selected from the following paper sizes:

<u>Recommended</u>	<u>Alternate</u>
B 1/2 x 11	-----
11 x 17	12 x 18
17 x 22	18 x 24
22 x 34	24 x 36

4.3.2.3.1 Additional information. The following additional information shall be included on the footprint:

- a. Tire size
- b. Ply rating
- c. Rated load and inflation
- d. Net and gross contact area
- e. Date
- f. Manufacturer's name
- g. QTR no.

4.3.2.4 Inflated profiles. Inflated profiles indicating actual inflated shape of the tire at rated and carrier (Navy) inflation pressures shall be submitted with each (Navy) Qualification Test Report (QTR).

4.3.3 Qualification tests. The qualification tests shall consist of all the tests specified under 4.5.

4.3.3.1 Qualification approval. Qualification approval shall apply to a specific construction and size, specific materials and values as defined in the manufacturer's QTR. The construction shall be identified by the manufacturer's QTR number. Changes in plants, construction, materials or processes that affect performance or appearance of the tire shall be cause for retest. A full description of such changes shall be submitted to the approving activity to determine status of change for proper procurement.

4.3.3.2 Construction identification. In order that the construction of tires in service may be positively identified by means of the date brand, only one construction for any manufacturer and only one item in Table 1 shall receive qualification approval on the latest issue of the Qualified Products List, unless otherwise authorized by the approving activity. Subsequent approval of different constructions for each manufacturer and each item shall supersede and cancel the approval given to the previous construction, except that approval of the manufacturer's tubeless-type construction shall not supersede and cancel previous approval for such item in a tube-type tire construction. Unless otherwise specified by the approving activity, any manufacturer having approval for any one item in Table 1 in a tubeless-type tire construction shall also be approved for manufacture of a tube-type tire of otherwise identical construction without further qualification testing other than those requirements specifically applicable to the tube-type tire construction as specified herein. The QTR number of a tubeless tire shall be the same as the number for the corresponding approved tube-type tire construction, followed by the letters TL.

4.3.4 Qualification inspection. When the supplier dynamically tests a tire, he shall section the tire for examination by the approving activity to determine any evidence of failure. The section shall be a full section, 2 inches in width, representative of the worst area, and shall be submitted on all tires. When the approving activity tests the tire, that activity reserves the right to section the tire in any manner necessary for the examination. When the supplier tests the tire, he shall hold the tire remains and all the test data until final qualification approval is granted.

4.3.4.1 Cross section. The supplier shall submit 8- by 10-inch photographs taken perpendicular to and showing clearly the complete cross section of the tire with adequate contrast between the ends and body of the carcass, breaker and tread reinforcement cords and the remainder of the tire section. The cross section shall completely fill the photograph, except for those tires where width is less than the paper size. The tire section shall be photographed against a plain white background with the beads spread so that the distance from heel-to-heel is the same as the flange-to-flange distance for the tire. A steel tape or ruler divided in 1/32-inch increments shall be laid at the base of the beads of the tire to show the distance between the bead heels. The photographs shall be submitted along with the QTR to the approving activity.

4.4 Quality conformance tests. Quality conformance tests shall consist of:

- a. Individual tests (4.4.1)
- b. Sampling tests (4.4.2)

4.4.1 Individual tests. Each tire shall be subjected to the following tests as specified under 4.5:

- a. Examination of product (4.5.1)
- b. Balance check (when limits are specified) (4.5.2).

4.4.2 Sampling plans and tests.

4.4.2.1 Tires rated 174 knots and above.

4.4.2.1.1 Cured tire sampling plan and controls. Unless otherwise specified (see 6.2), a sample shall be selected from the first 100 tires produced. Subsequent samples shall be selected at approximately equal intervals throughout the balance of the production lot in accordance with MIL-STD-105. Each sample shall be subjected to the following tests at the inspection level indicated.

<u>Required Test</u>	<u>Inspection Level</u>
a. Dimensions	S - 2
b. Weight	S - 2
c. Bead width	S - 2
d. Balance check ^{1/}	S - 2
e. Air retention (tubeless)	S - 2
f. Tread-to-carcass adhesion	S - 2
g. Sidewall-to-carcass adhesion	S - 2
h. Balance pad adhesion	S - 2
i. Burst pressure	S - 2

^{1/} Does not remove requirement for 100-percent balance check.

4.4.2.1.1.1 Production lot. For sampling purposes, a production lot shall be defined as all tires of a particular size and type produced under substantially the same conditions as one continuous run regardless of purchase order number. A break in production of more than 2 months shall require the redesignation of the new production as a separate lot. If production exceeds a 6-month period, and the production is not sufficient to require sampling in accordance with MIL-STD-105, a separate lot shall be formed with an immediate selection of one sample. Subsequent production shall constitute a new lot.

4.4.2.1.1.2 Test procedure, inspection values and test controls. The detailed test procedure, minimum acceptable inspection values, and test controls for the cured tire sampling plan shall be established by the contractor. This data shall be included in the tire QTR.

4.4.2.1.1.3 Destructive tests. Tires selected for destructive tests shall be representative of the production process. The first tire that is selected for a destructive test shall be inspected after sectioning to determine that the construction is identical to that of the original qualified tire for which construction details were submitted on the QTR.

4.4.2.1.1.4 Rejection and retest. When a sample tire fails to pass the required cured tire tests, the following action shall be taken:

- a. Shipment of the questionable lot shall be stopped, and the lot shall be held pending additional tests. The questionable lot for the purpose herein is defined as in-process, production, and finished tires which have not been shipped from the contractor's facility.
- b. Tires selected for additional tests shall be selected at random.
- c. Shipments of questionable lots will not be released until the cause of failure has been isolated and corrected. An analysis of the cause of failure and the required corrective action shall be submitted to the procuring activity for engineering evaluation and approval by the responsible activity.

4.4.2.1.2 Adhesion and cure controls of materials. The following raw material tests and records shall be required:

- a. Bead wire adhesion tests shall be conducted on bead wire used in production with mixes of insulation compounds or controlled laboratory mixes of these stocks. Adhesion values shall be determined at jaw separation of 2 inches (maximum) per minute, per 1 linear inch cured into rubber. Either a single wire or multiwire mold may be used. Bead wire meeting the acceptable minimum values shall be coded and properly stored to assure no change in adhesion values.
- b. Bead insulation stock shall be checked for adhesion to bead wire to assure no change in adhesion values.
- c. Calendered fabric - Adhesion tests shall be conducted on samples of bead wrap, bead flipper, inner plies, outer plies, and breaker and tread ply calendered fabric material. Each sample taken shall be tested for adhesion to itself or mating material.

4.4.2.1.2.1 Cure controls. Control procedures and records for assuring proper time, pressure and temperature relating to cure, shall be established by the contractor.

4.4.2.1.2.2 Test and record procedures, frequency, and inspection values. The detailed test and record procedures, frequency, and minimum acceptable inspection values relative to adhesion and cure controls shall be included in the tire QTR or referenced therein.

4.4.2.1.2.3 Rejection. Material lots represented by samples which do not meet the minimum requirements shall be rejected.

4.4.2.2 Tires rated below 174 knots.

4.4.2.2.1 Sampling plan A. Unless otherwise specified (see 6.2), a certificate from the manufacturer stating conformance to this specification will be acceptable for production runs of 50 tires, or less.

4.4.2.2.2 Sampling plan B. Unless otherwise specified (see 6.2), one tire of each type and construction shall be selected at random from each 51 to 500 tires and one from each additional 1,000, or fraction thereof, produced and shall be subjected to the following tests as specified under 4.5:

- a. Tire measurements (4.5.3)
- b. Weight (4.5.3.2)
- c. Bead width (4.5.3.2)
- d. Balance (when limits are specified) (4.5.3.2)
- e. Air retention (where applicable) (4.5.10)

4.4.2.2.3 Sampling plan C. Unless otherwise specified (see 6.2) one tire of each type and construction shall be selected at random from each 51 to 5,000 produced and shall be subjected to the following tests as specified under 4.5:

- a. Bead width (4.5.3.2)
- b. Dimensions (measurements of tires) (4.5.3)
- c. Total tread thickness (4.5.3.2)
- d. Weight (4.5.3.2)
- e. Air retention (where applicable) (4.5.10)
- f. Balance pad adhesion (4.5.4)
- g. Burst pressure (4.5.12)

4.4.2.2.3.1 Selection samples. Each sample selected in accordance with sampling plan C shall also be examined or tested to determine conformance of the construction details to those reported for the qualification test sample.

4.4.2.2.4 Rejection and retest (sampling plans B and C). When a sample tire fails to pass the required tests, rejection and retest shall be as specified in 4.4.2.1.1.4.

4.5 Test methods.

4.5.1 Examination of product. The tire shall be visually examined to

determine compliance with the requirements specified in MIL-STD-698 and herein with respect to workmanship and marking.

4.5.2 Balance. The tire shall be balance checked by determining that the moment required to static balance the tires does not exceed the limits specified in Table I.

4.5.3 Tire measurements. The tire shall be mounted on its rim, inflated to the specified rated inflation pressure, allowed to stand for 12 hours minimum at room temperature and then readjusted to rated pressure. The tire dimensions, as specified in Table II, shall then be determined.

4.5.3.1 Outside diameter. The outside diameter shall be determined by dividing the outside circumference by 3.1416.

4.5.3.2 Other measurements. The weight, total tread thickness, balance, and bead width shall be determined and shall be in accordance with Table I.

4.5.3.3 Shoulder measurement. The point at which the maximum shoulder width and diameter is measured for new, unused, inflated tires must lie on or within one or two arcs that meet at the shoulder dimension point designated by columns C and D in Table II. Using figure 4 for a reference, the center of the first of these arcs (arc X) shall be determined as follows:

- a. Measure a distance of $D/2$ from the diametral extremity of the tire on the vertical centerline of the wheel towards the hub of the wheel. From this point, construct a line perpendicular to the vertical centerline of the wheel, then construct an arc from point C, D with radius $D/2$ so that it intersects the perpendicular line. This point of intersection is the center for arc X. The radius of arc X is $D/2$.
- b. The center of the second arc (arc Y) shall be determined as follows: Construct another perpendicular line to the vertical centerline of the wheel so that it intersects the midpoint of the maximum tire section height (H) 1/. Then construct the perpendicular bisector of a line joining point C, D and a point located vertically at the midpoint of the maximum tire section height and horizontally at the right-hand extremity of the maximum section width shown on figure 4. The point where the perpendicular bisector and the perpendicular line through the midpoint of the section height of the tire intersects shall be the center of arc Y. The radius of arc Y shall extend from this point to point C, D.

1/ $H = \text{Maximum tire radius minus wheel ledge radius.}$

4.5.4 Balance pad adhesion. Balance pad adhesion shall be tested to determine compliance with the requirements specified in 3.5.5.

4.5.5 Loaded radius. The tire shall be inflated to rated static inflation pressure and allowed to stretch for a minimum of 12 hours. The tire pressure shall then be adjusted to compensate for air loss and tire growth by adding only enough air to bring the pressure up to the rated static pressure, and the tire shall then be measured.

4.5.5.1 Load deflection. The tire and wheel assembly shall be mounted on a load deflection machine and, using a load rate not in excess of 2 inches per minute, the tire shall be deflected to approximately one-half the distance of the tire section height minus the flange height.

4.5.5.2 Plate deflection. The tire shall be placed on a flat plate and deflected with rated static pressure at a loading rate of 2 inches per minute or less, until the rated static load is reached. This load shall be held constant for 1 minute to allow for drift. The tire loaded radius shall then be measured and shall be within the manufacturer's limits as reported on their respective Qualification Test Report.

4.5.6 Bead Fit. The bead seating pressures shall be measured by employing an electrical contact system to determine when the bead has been seated against the wheel flange. After placement of the shim stock at 3 locations 120 degrees apart around tire, the tire is inflated. The pressure at which the last shim makes electrical contact shall be considered the bead-seating pressure. The tire shall retain air at the bead-seating pressure. The test shall be accomplished without using lubricant on either bead or rims. Table III shows the bead seating requirements. An alternate method may be used when authorized by the approving activity.

4.5.7 Dynamic durability test. The tire shall be subjected to the following dynamic tests. There shall be no failure or visible deterioration other than normal tread wear. Tires for qualification test shall be balanced to the same requirements as the production tires. Unless otherwise specified, the contained air or carcass temperature at the start of 80 percent of the test cycles shall not be less than $41^{\circ} \pm 3^{\circ}\text{C}$ ($105^{\circ} \pm 5^{\circ}\text{F}$). The manufacturer shall provide details of the method of obtaining the temperature and shall record the temperatures in the DTR. Use of critical carcass temperature is preferred over use of contained air.

4.5.7.1 Tires rated 139 knots and under. Tires shall withstand at least 200 cycles of the dynamic test when tested on a dynamometer.

4.5.7.1.1 Flywheel weight. The flywheel weight shall be set up in such a manner that at 104 knots, the kinetic energy (KE) value, computed as follows, shall be stored up in the dynamometer:

$\text{KE} = \text{CWV}^2$, where KE = Kinetic energy - ft-lb

W = tire load - lb

V = 104 knots

C = 0.015

(2)

Note: The tire shall be forced against the flywheel at the specified load as listed in Table I.

4.5.7.1.2 Landing cycles. The landing cycles shall be divided into two speed ranges. In the first series of 100 landings, the landings shall be at 78 knots and the unlandings at 0 knot. In the second series of 100 landings, the landings shall be at 104 knots and the unlandings at 78 knots.

4.5.7.1.3 Tire test inflation pressure. The test inflation pressure shall be that as specified in Table 1, adjusted for flywheel curvature by multiplying by the appropriate ratio obtained from figure 5. The inflation pressure shall be checked and corrected if necessary after every five test cycles. Tires shall be inflated and checked with no load on the tire.

4.5.7.1.4 Flywheel plates. In the event that a whole number of flywheel plates cannot be used to obtain the calculated KE value or proper flywheel width, a higher number of plates shall be selected. The landing speed of the 78- to 0-knot series of landings shall be decreased as necessary so that 56 percent of calculated KE is absorbed by the tire during this series.

4.5.7.1.4.1 Landing speeds. If this results in landing speeds less than 70 knots, the following shall apply: Landing speed shall be determined by adding 26 percent of the test KE to the flywheel KE at 55.6 knots. Unlanding speed shall then be determined by subtracting 26 percent of the test KE from the flywheel KE at 55.6 knots.

4.5.7.1.4.2 Unlanding speeds. The unlanding speed of the 104- to 78-knot series of landings shall be increased as necessary so that 44 percent of calculated KE is absorbed by the tire during this series.

4.5.7.2 Tires rated above 139 knots. The tires shall be subjected to and satisfactorily pass tests equal to the expected aircraft operating conditions. These tests shall include complete load and time information for all taxi-takeoff and landing-taxi conditions. Yaw and camber tests may be required; configuration test conditions shall be defined in drawings, standards or other documents as approved by the responsible Government activity. Unless otherwise specified, tires for fighter and attack aircraft shall withstand a minimum of 50 such test cycles. Unless otherwise specified, other aircraft shall withstand at least 100 test cycles. Requirements for more than one successful test unit shall be identified in the individual specification document and approved by the responsible procuring activity.

4.5.7.3 Dynamic test. At the conclusion of the dynamic test, the following shall apply:

4.5.7.3.1 Cord fraying fabric (reinforced) tread construction. Cord fraying, if present in the groove of the tire, shall be only on the outer layer or cord. Unless otherwise specified, the maximum allowable broken and frayed cords shall be as follows:

Broken cords	One groove	30 percent of one tire circumference
Broken cords	All grooves (accumulative)	40 percent of one tire circumference

Frayed cords	One groove	65 percent of one tire circumference
Frayed cords	All grooves (accumulative)	95 percent of one tire circumference
Broken and frayed cords	One groove	65 percent of one tire circumference
Broken and frayed cords	All grooves (accumulative)	95 percent of one tire circumference

The edges of the fabric cord inserts shall remain firmly anchored and shall not be exposed. The tire circumference shall be measured at rated pressure and in the groove which contains the fault.

4.5.7.3.2 Tread chunking. The maximum amount of tread chunking allowed in any one spot shall not exceed 1 square inch in area or 75 percent of the mold skid depth. There shall be not more than three chunks 1/2 to 1 square inch in area or 10 chunks totaling more than 4 square inches in area out of the tread. Tread chunking around the wear depth holes shall not be included unless the chunkout exceeds 1 square inch in size.

4.5.7.3.3 Groove cracking - rubber and fabric tread tires. There shall be no groove cracking in tires having all rubber tread. In tires of fabric treads, any void in the bottom of the groove shall be no deeper than a void caused by the outer layer of cord being pulled through the rubber stock in the bottom of the groove. There shall be no rib undercutting. The tire shall be inspected when inflated to rated pressure.

4.5.7.3.4 Bead separation. If bead wire or bundle separation is found in the cut section of a tire that has completed the required test, the fabric around the bead bundles shall be stripped back at least 1 inch to determine if separation was caused by sectioning the tire or was due to testing. If no separation is found in the stripped area, the bead will be considered satisfactory.

4.5.8 Physical and chemical properties. Tests for tread and sidewall adhesion shall be conducted in accordance with FED-STD-601.

4.5.9 Torsion recovery at low temperature.

4.5.9.1 Preparation of samples. Samples shall be multiple compound type, consisting of the various tread carcass compounds used in the tire (tubeless tire innerliner compound omitted). Dimensions shall be as follows:

Length - $6 \pm 1/16$ inch

Width - $1 \pm 1/32$ inch

Tread compound thickness of the sample - $0.30 \pm 0.03, -0.00$ inch

Total sample thickness - $5/8 \pm 0, -1/16$ inch.

Carcass compounds shall occur in the same order and equivalent thickness as used in the 26 x 6.6 14 PR construction. Thickness of carcass compounds shall be adjusted proportionately to suit required sample thickness. Samples shall be cured to provide a minimum cure equivalent to 30 minutes at 145°C (293°F). Each sample shall be identified by a construction or serial number. A minimum of three samples shall be conditioned and tested as follows.

4.5.9.2 Torsion recovery. Unless otherwise specified, a given construction will be considered acceptable if the average angular recovery, in 60 seconds, for three examples is not less than 16.5° at -58°F. The torsion test may be conducted by the manufacturer who shall submit results to the approving activity. Qualification test reports for specific tire sizes shall show reference to the applicable low temperature approval.

4.5.9.2.1 Apparatus. The test unit shall be in accordance with Drawing 61F4001 (0.030 diameter bearing clearance). The following preparation shall be made:

Use a standard 5-gallon container for the acetone dry ice liquid conditioning bath. (approximate dimensions - 1D 11-1/4 inches, depth 12 3/4 inches). Insulate the sides and bottom of the container to keep heat transfer to a minimum. Provide mild power agitation. Elevate the test unit so that the lower end of the sample is 2 inches above the floor of the container. Allow circulation of the bath under the unit. Use a total-immersion-type glass thermometer, properly calibrated, for measuring the bath temperature. A toluene thermometer, such as Princo Catalogue 163 (Precision Thermometer and Instrument Company), or equal, is recommended. Locate the temperature control point 1/2 inch from the torque plate (2-3/4 inches from axis of sample) and 90° from the release pin.

4.5.9.2.2 Procedure. The procedure shall be performed in the following manner:

Bring the acetone dry ice bath to optional temperature below -50°C (-58°F). Prior to immersing the test apparatus, bring the acetone dry ice bath to a temperature below -50°C (-58°F) so that equilibrium temperature after immersion will be -50°C (-58°F). The level of the bath shall be 1 inch above the lower bearing support. Be sure that the test apparatus is completely dry before immersing and clamp securely in place. The length of the sample between clamps shall be 4 ±1/32 inch. Make sure the upper clamp and shaft are floating freely. Preflex the sample gently 10 times to 180°. Do not allow the sample to snap back. Twist and lock the sample in the 180° notch (this will be considered zero position). Let stand 10 minutes before immersing. Set the pointer to zero position. Immerse the unit so that the sample is in the center of the bath. Maintain the bath temperature at -50°C (-58°F) and soak 1 hour. Use isopropyl alcohol on the release pin and top bearing 15 minutes before releasing to avoid frosting and facilitate releasing. Release and record the angular recovery after 60 seconds.

4.5.9.3 Tubeless tire, low temperature qualification. The torsion recovery test limits will qualify both tubed and tubeless tires with respect

to the carcass and tread compound construction. The qualification of a tubeless tire inner liner shall be obtained by the sample satisfactorily passing a test in accordance with ASTM D746-73, or equivalent, at -50°C (-58°F). An alternate test method may be utilized provided data is submitted substantiating an equivalent test method and is approved by the responsible procuring activity.

4.5.10 Air retention tests for tubeless tires. The tire shall be inflated to the pressure specified below and allowed to stand for a minimum of 12 hours, at which time the pressure loss due to stretch shall be replaced. The tire shall then stand for an additional 24 hours, at which time the pressure shall be measured to determine if loss is within the limits of 3.5.3. Unless otherwise specified the test pressure for tires shall be the rated pressure specified in Table I. At no time shall the tire be inflated above rated inflation pressure to obtain air retention.

4.5.11 Conductive material. The determination of the allowable conductivity of the exterior new tire surface (tread and sidewall) shall be measured between probes placed at opposite exterior points, within an inch above the bead seat area. Test results shall be obtained by placing the test probe points of a high quality volt-ohmmeter (in the 100,000 ohm/volt class) at six circumferential points around the tire approximately evenly spaced at positions relative to the bead as stated above. The tire area to be probed should be free of dirt or grease, and the test probes should be cleaned immediately prior to the test to insure good contact. Also, the pressure of the probes against the tire should be fairly high and constant (as applied by hand) without damaging the tire material. The average of the six readings made on each new tire shall be 50,000 ohms or less in order to be acceptable.

4.5.12 Burst pressure. The minimum burst pressure as determined in accordance with 3.5.5 shall be applied to the mounted tire and held for 10 seconds minimum. The tire shall not fail under this pressure. The tire shall then be increased until the tire bursts or the limit of the equipment is reached; provided the limit of the equipment is over the minimum burst pressure. Burst pressure test of tubeless tires may be conducted with an inner tube in the same manner as for tube-type tires. The testing agency shall report whether failure was a carcass or a bead failure.

4.5.13 Service tests. The procuring activity may conduct service tests consisting of flight or taxi tests at a Government Laboratory or field installation if deemed necessary to determine compliance with the actual usage requirements.

5. PREPARATION FOR DELIVERY

5.1 Packing and Packaging. Unless otherwise specified (see 6.2), tires shall not require packing or unpacking.

5.2 Marking for shipments. Each tire shall be labeled in accordance with MIL-STD-129. The identification shall consist of the following information, listed in the order shown:

NSN Tire, Pneumatic, Aircraft Specification MIL-T-5041H

5.2.1 Color coding, age identification. The tire shall be color-code taped for age identification using the color of tape in accordance with MS14113. Color used shall reflect year of carcass manufacture, with the date of year superimposed on the tape.

6. NOTES

6.1 Intended use. Tires covered by this specification are intended for use on aircraft main, nose, tail, beaching and auxiliary wheels.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification
- b. Size and ply rating (see 1.2 and 3.4.1)
- c. Sampling plans, if other than specified (see 4.4.2)
- d. When packing or packaging is required (see 5.1)

6.2.1 Ordering. If the tires which are ordered for helicopter or beaching gear use have been qualified as regular airplane tires, they must not be marked (helicopter) or (beaching gear) and the order should so indicate.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is Ogden Air Logistics Center, Attn: MMILBE, Hill Air Force Base, Utah 84056. Information pertaining to qualification of products may be obtained from that activity.

6.3.1 Dynamometer testing. Dynamometer testing at the AFWAL Flight Dynamics Laboratory, designated a DOD facility by Department of Defense Instruction 4151.13, is available to responsible activities within the Army, Navy, Air Force and other Government Agencies. Testing services may also be made available to industry when the testing is in direct support of Military/Government programs, and when the responsible department, agency or other activity specifically authorizes, requests or sponsors the test support. Test requests should include a detailed description of the test plan and the time period during which the requesting organization desires the test to be conducted. Correspondence relating to requests for test support or information on specific test capabilities should be addressed to:

AFWAL/FIEMA Wright Patterson Air Force Base, Ohio 45433

6.3.2 For further information regarding qualification procedures, applicants proposing to submit a product for qualification approval should refer to Defense Standardization Document SD-6 entitled, Provisions Governing Qualification.

6.4 Definitions.

6.4.1 Ply rating. The term ply rating (PR) is used to identify a given tire with its maximum recommended load when used in a specific type of service. It is an index of the tire strength and does not necessarily represent the number of cord plies. The ply ratings appearing in Table I is not to be interpreted as limiting the number of plies that may be used in a given tire construction.

6.4.2 Ribbed tread. A ribbed-type tread pattern is one having continuous circumferential ribs and grooves.

6.4.3 Skid depth. Skid depth is the radial distance, measured along the centerline of the tire mold, from the line enveloping the outer cross section of the tread to the line enveloping the outer cross section of the undertread.

6.4.4 Fabric Reinforced Tread. A fabric reinforced tread is one with a fabric ply or plies constructed in the material between the outer carcass ply and the bottom of the tread grooves.

6.4.5 Fabric Tread. A fabric tread is one with a fabric ply or plies constructed in the tread ribs above the bottom of the tread grooves.

6.5 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.6 Subject term (key word) listing.

AMSC Number
Aircraft tire
Bead fit
Cut limit
Fabric tread
Loaded radius
Fly rating
pneumatic
Rim dimension Skid depth
Tread chunking
Tubeless
Tube type

Custodians:

Army - AV
Navy - AS
Air Force - 99

Review activities:

Army - AV
Navy - AS

User activity:

Navy - MC

Preparing activity:

Air Force - 70

Project No. 2620-0235

MIL-T-5041H

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Maximum Moment of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or MS Number	Speed Rating KTS.
T-TT	10.00	8	650	45	180	0.70	3.5		0.08	--	104
M-TT	33	10	8,000	70	280	1.38	45.0	22	0.30	--	104
M-TT	36	12	10,500	70	280	1.50	64.0	32	0.32	--	104
M-TT	44	12	15,000	70	280	1.75	105.0	50	0.38	--	104
M-TT	56	20	35,000	100	400	2.50	230.0	80	0.37	--	104
M-TL	56	20	35,000	100	400	2.65	245.0	80	0.37	--	104
T-TT	5.00-4	6	1,200	55	220	0.70	6.5	14	0.09	--	104
M-TT	5.00-5	4	800	31	124	0.70	5.0	14	0.11	53D917	104
M-TT	5.00-5	10	2,150	68	352	0.90	7.5	14	0.16	--	104
T-TT	5.50-4	6	1,225	50	200	0.875	9.0	5	N/A	62C31331	104
N-TT	6.00-6	6	1,750	42	168	0.75	8.5	8	0.18	--	104
M-TT	6.00-6	8	2,350	55	220	0.90	10.5	8	0.18	--	104
M-TT	6.50-8	6	2,300	51	204	0.85	11.5	16	0.20	--	104
M-TL	6.50-8	8	3,150	75	300	0.95	12.0	16	0.20	--	104
M-TL	6.50-10	6	2,770	62	248	0.85	12.5	16	0.20	--	104
M-TL	6.50-10	10	4,750	100	400	0.95	17.5	16	0.20	--	104
M-TT	7.00-6	6	1,900	38	152	0.75	10.0	16	0.19	--	104
M-TL	7.00-8	16	6,650	125	500	1.30	24.0	7	0.20	67J1951	130

1/M-Main Wheel; N-Nose Wheel; T-Tail Wheel; TT-Tubetype; TL-Tubeless

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Maximum Percent of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or MS Number	Speed Rating KTS.
M-TT	7.50-10	6	3,000	46	184	0.80	16.0	16	0.21	--	104
M-TL	7.50-10	6	3,000	46	184	0.80	17.5	16	0.21	--	104
N-TT	7.50-10	12	1,800	60	620	1.50	30.0	8	0.33	MS3502	100
N-TT	7.50-14	8	5,700	87	348	1.00	30.0	16	0.37	--	104
M-TT	8.50-10	6	3,250	41	164	0.90	20.0	16	0.33	--	104
M-TT	8.50-10	8	4,400	55	220	1.05	22.0	16	0.12	--	104
M-TL	8.50-10	10	5,500	70	280	1.35	24.0	16	0.12	54C763	104
M-TL	8.50-10	12	8,000	100	400	1.50	29.5	16	0.33	--	104
T-TT	9.00-6	10	4,500	52	232	1.00	24.0	16	0.28	--	104
N-TT	9.50-16	10	9,250	90	360	1.40	55.0	20	0.41	--	104
M-TT	11.00-12	6	6,300	45	160	1.20	45.0	24	0.30	--	104
M-TL	11.00-12	8	6,300	45	160	1.35	46.0	24	0.30	--	104
M-TL	12.50-16	12	12,800	75	300	1.90	86.0	17	0.45	64F1880	130
M-TT	15.50-20	14	20,500	90	360	2.35	132.0	52	0.45	--	104
M-TT	15.50-20	20	29,900	135	540	2.60	170.0	52	0.46	--	104
M-TT	17.00-16	12	16,000	60	240	1.90	126.0	52	0.48	--	104
M-TT	17.00-20	22	34,500	150	520	2.70	190.0	80	0.51	--	104
M-TL	20.00-20	26	46,500	125	500	3.50	270.0	90	0.40	65D1542	174

1/M-Main Wheel, N-Nose Wheel, T-Tail Wheel; TT-Tube-type; TL-Tubeless

MIL-T-5041H

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Maximum Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Moment of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or Pz Number	Speed Rating KTS.
N-TT	12.5x4.5	14	3,000	165	500	1.25	8.0	10	0.25	65D30091	104
N-TT	16x4.4	6	1,700	85	298	0.70	9.5	9	0.20	57D793	104
M-TT	16x4.4	8	2,300	120	420	1.125	8.0	9	0.20	59C520	104
N-TL	18x4.4	6	2,100	100	350	1.00	11.0	5	0.17	56D1172	174
N-TT	18x4.4	12	4,350	225	785	1.15	13.5	5	0.17	58D514	217
M-TL	18x5.5	8	3,050	105	430	1.25	13.5	10	0.24	MS26535	104
N-TL	18x5.5	12	5,050	175	765	1.40	17.5	10	0.24	MS26535	104
M-TL	18x5.5	14	6,200	200	900	1.50	21.5	10	0.24	MS26535	104
M-TL	18x5.5	14	6,200	215	753	1.50	18.5	4	0.17	66D1895	239
M-TT	20x4.4	10	4,250	190	855	1.15	13.5	11	0.18	MS26538	139
M-TL	20x4.4	10	4,250	190	855	1.30	15.6	11	0.18	MS26538	139
M-TL	20x4.4	12	5,150	225	875	1.30	15.0	11	0.26	56D1171	174
M-TL	20x4.4	14	6,000	265	1,060	1.30	17.0	11	0.26	6631427	174
M-TL	20x5.5	12	6,150	180	810	1.38	22.0	12	0.26	MS26540	139
M-TL	20x5.5	14	7,200	230	920	1.38	22.0	12	0.26	MS26540	139
M-TL	20x5.5	16	8,750	270	1,080	1.51	22.0	12	0.26	MS3374	160
M-TL	22x5.5	8	4,350	135	610	1.25	18.5	13	0.19	MS26539	139
M-TT	22x5.5	12	7,100	235	1,060	1.30	20.0	13	0.19	MS26539	139
M-TL	22x5.5	12	7,100	235	1,060	1.45	22.5	13	0.19	MS26539	139
M-TT	24x5.5	12	7,500	230	805	1.30	23.0	6	0.20	48F64	174
M-TT	24x5.5	12	8,070	250	1,000	1.25	22.5	15	0.20	MS26526	139

1/M-Main Wheel, N-Nose Wheel, T-Tail Wheel: TT-Tubetype: TL-Tubeless

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Maximum Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Percent of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or MS Number	Speed Rating KTS.
M-TL	24x5.5	12	8,070	250	1,000	1.35	25.0	15	0.20	MS26526	139
M-TT	24x5.5	14	9,700	275	1,100	1.375	25.0	15	0.20	MS26526	139
M-TL	24x5.5	14	9,700	275	1,100	1.50	27.5	15	0.20	MS26526	139
M-TT	24x5.5	16	11,500	355	1,420	1.40	29.5	15	0.35	MS18060	174
M-TT	24x7.7	10	5,100	85	380	1.25	25.0	17	0.35	MS26556	139
M-TL	24x7.7	14	8,200	135	475	1.50	32.0	8	0.12	56D510	217
M-TT	25x5.5	16	11,500	355	1,420	1.40	29.5	15	0.35	MS18060	174
M-TT	25x6.0	16	12,000	330	1,320	1.65	32.0	7	0.21	MS26543	139
M-TL	25x6.75	18	13,000	300	1,050	2.00	38.0	17	0.21	59D502	239
M-TL	26x6.6	14	10,000	225	790	1.625	36.5	17	0.30	60C42B0	174
M-TL	26x6.6	14	10,000	225	945	1.75	36.0	17	0.21	MS26533	139
M-TL	26x6.6	16	12,000	270	1,200	1.85	38.0	17	0.21	MS26533	174
M-TL	28x7.7	14	11,000	195	780	1.75	45.0	17	0.45	MS17835	174
M-TT	30x6.6	14	12,950	320	1,040	1.60	46.0	15	0.30	63DS1622	195
M-TL	30x8.8	22	21,000	295	1,035	2.40	75.0	21	0.26	60D90767	217
M-TT	32x6.6	12	11,000	135	540	1.60	45.0	20	0.24	MS26537	139
M-TT	32x6.6	16	15,100	200	700	1.90	50.0	20	0.40	--	139
N-TT	32x8.8	18	15,800	200	900	2.00	60.0	20	0.24	MS26537	139
N-TL	32x8.8	18	15,800	200	900	2.15	65.1	20	0.24	MS26537	139

1/M-Main Wheel, N-Nose Wheel, T-Tail Wheel, TT-Tube-type, TL-Tubeless

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Maximum Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Moment of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or MS Number	Speed Rating KTS.
M-TL	32X8.8	24	23,300	335	1,180	2.75	80.0	21	0.24	63D31707	239
M-TT	34X9.9	14	14,000	150	600	1.75	60.0	13	0.31	MS14162	139
M-TL	34X9.9	14	14,000	150	600	1.90	66.0	13	0.31	MS14162	139
M-TL	36X11	22	23,300	200	800	2.70	88.0	16	0.28	61D4306	174
M-TL	36X11	22	23,300	200	700	2.90	95.0	16	0.28	MS21444	174
M-TL	36X11	24	26,000	235	825	2.90	92.0	30	0.26	61D3065	217
M-TL	36X11	28	31,500	290	1,160	2.80	99.0	30	0.30	MS90346	174
M-TL	38X11	14	15,400	130	455	2.20	90.0	18	0.25	61D3069	195
N-TL	39X13	16	17,200	115	400	2.30	97.0	10	0.30	63D3009	195
M-TT	40X12	14	14,500	95	380	2.38	95.0	40	0.37	--	104
M-TL	40X14	26	30,500	175	700	3.10	133.0	17	0.30	MS26563	174
M-TL	44X13	26	35,000	210	800	3.15	155.0	25	0.31	MS26557	174
M-TL	44X16	28	38,400	185	740	3.25	177.0	50	0.38	61F4307	174
M-TL	46X16	28	41,800	210	840	3.10	186.0	52	0.33	TS0C62C	195
M-TL	49X17	26	39,600	170	595	3.05	215.0	40	0.40	60D2561	195
M-TL	49X17	26	39,600	170	595	3.05	153.0	40	0.30	71203	174
M-TL	56X16	24	45,000	175	625	3.88	275.0	90	0.35	68D29340	174

1/M-Main Wheel, N-Nose Wheel, T-Tail Wheel; TT-Tubetype; TL-Tubeless

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Maximum Percent of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or PS Number	Speed Rating KTS.
M-TL	56x16	38	76,000	315	1,100	4.60	335.0	90	0.33	60D510	217
N-TT	15x6.0-6	4	1,250	45	180	0.80	8.0	8	0.22	—	104
M-TL	17.5x6.25-11	8	2,750	140	560	1.10	11.0	10	Smooth	—	104
M-TL	18x5.7-8	14	6,200	215	860	1.50	16.3	2.5	0.25	MS14196	200
N-TL	18x5.7-8	18	8,600	300	1,050	1.50	16.5	4	0.17	6D16VL027	217
N-TL	18x6.5-8	12	5,000	150	525	1.50	12.0	5	0.20	63J4242	223
N-TL	21x7.25-10	20	12,000	320	1,120	2.00	30.0	15	0.22	C2318	195
N-TL	22x6.6-10	18	10,700	260	910	2.00	27.0	10	0.22	841256E	200
N-TL	22x6.6-10	20	12,000	270	1,080	2.00	27.5	15	0.22	MS14168	189
N-TL	22x6.75-10	18	10,600	245	980	2.05	25.0	10	0.26	MS14161	135
N-TT	22x7.25-11.50	8	4,600	80	320	1.00	16.0	12	Smooth	—	104
M-TL	22x8.5-11	16	10,000	210	735	1.875	27.0	7	0.20	63J4241	217
M-TL	24x6.5-14	18	12,900	375	1,560	1.65	35.0	15	0.30	MS14178	200
M-TL	24x8.0-13	18	12,500	265	1,000	2.05	29.0	13	0.21	73453	250
M-TL	25.5x8.0-14	20	16,200	310	1,085	2.10	41.0	17	0.25	6D16VL025	217
M-TL	26x7.75-13	8	5,600	85	340	1.31	26.0	8	0.25	MS14159	167
M-TL	26x7.75-13	10	8,100	125	500	1.50	25.5	8	0.25	MS14225	180
M-TL	26x8.0-14	16	12,700	235	910	2.10	44.0	17	0.20	61D3001	239
M-TL	26x8.75-11	12	10,070	105	420	1.55	30.0	8	0.25	MS14160	163
M-TL	28x9.9-12	22	16,650	235	940	2.25	55.0	10	0.45	MS90445	150

1/M-Main wheel, N-Nose wheel, T-Tail wheel; TT-Tubetype; TL-Tubeless

TABLE 1. SIZE, CONSTRUCTION, AND PERFORMANCE CHARACTERISTICS

Wheel Type 1/	Size	Ply Rating	Static Load Rating Lbs.	Rated Inflation Pressure PSI.	Minimum Burst Pressure PSI.	Maximum Bead Width Inch	Maximum Tire Weight Lbs.	Maximum Moment of Static Unbalance In.-Oz.	Minimum Mold Skid Depth Inch	Drawing or MS Number	Speed Rating KTS.
M-TL	28X9.0-14	22	18,100	280	980	2.25	61.0	10	0.30	74201	186
M-TT	29X11.00-10	10	7,070	60	240	1.40	38.0	10	0.35	MS90444	104
M-TL	30X11.5-14.5	24	25,000	245	850	2.75	75.0	19	0.26	62J4031	208
M-TL	30X11.5-14.5	26	25,000	245	1,400	2.75	83.0	19	0.30	MS14171	214
M-TL	30X11.5-14.5	26	26,000	265	928	2.75	80.0	19	0.26	MS21781	220
M-TL	31X11.5-16	22	23,300	275	960	2.65	80.0	10	0.25	57F794	239
M-TL	34.5X9.75-18	26	30,100	340	1,190	2.55	81.0	20	0.35	8412569	225
M-TL	37X11.5-16	28	31,200	245	980	3.15	95.0	17	0.30	MS14152	189
M-TL	47X18-18	30	43,700	175	613	3.50	188.0	60	0.30	69E177	195
M-TL	47X18-18	36	54,000	215	753	3.90	205.0	60	0.30	65J1971	217

1/M-Main Wheel, N-Nose Wheel, T-Tail Wheel; TT-Tubetype; TL-Tubeless

TABLE 11. DIMENSIONS OF AIRCRAFT TIRES

Size	Outside Diameter		Section Width		Shoulder Diameter Maximum	Shoulder Width Maximum
	Minimum	Maximum	Minimum	Maximum		
10.00	9.76	10.06	4.00	4.18	9.00	2.52
33	32.06	33.06	10.84	11.30	31.30	6.60
36	35.40	36.86	12.56	13.08	34.84	7.02
44	43.64	44.94	15.12	15.76	42.50	8.52
56	53.44	56.62	19.12	19.92	53.44	11.44
5.00-4	12.99	13.47	5.26	5.54	13.47	4.27
5.00-5	13.65	14.20	4.65	4.95	12.55	4.20
5.50-4	12.99	13.47	5.26	5.54	—	—
6.00-6	16.80	17.50	5.90	6.30	15.45	5.35
6.50-6	19.15	19.85	6.35	6.95	17.70	5.90
6.50-10	21.35	22.10	6.25	6.65	19.90	5.65
7.00-6	18.00	18.75	6.45	7.00	16.45	5.95
7.00-8	20.10	20.85	6.85	7.30	18.55	6.20
7.50-10	23.30	24.15	7.20	7.65	21.60	6.50
7.50-14	27.00	27.75	7.20	7.65	25.30	6.50
8.50-10	24.70	25.65	8.20	8.70	22.80	7.40
9.00-6	21.40	22.40	8.55	9.25	19.45	7.85
9.50-16	32.50	33.35	9.10	9.70	30.25	8.25
11.00-12	31.00	32.20	10.50	11.20	28.55	9.50
12.50-16	37.09	38.44	11.98	12.75	34.40	10.85
15.50-20	44.30	45.25	15.05	16.00	40.70	13.60
17.00-16	43.70	45.05	16.35	17.40	39.80	14.80
17.00-20	47.70	48.75	16.40	17.25	43.60	14.65
20.00-20	54.30	56.00	19.20	20.10	49.50	17.10
12.5x4.5	12.10	12.85	4.45	4.85	12.40	4.20
16x4.4	15.50	16.00	4.15	4.45	14.55	3.90

TABLE II. DIMENSIONS OF AIRCRAFT TIRES

Size	Outside Diameter		Section Width		Shoulder Diameter Maximum	Shoulder Width Maximum
	Minimum	Maximum	Minimum	Maximum		
18x4.4	17.40	17.90	4.15	4.45	16.50	3.79
18x5.5	17.30	17.90	5.35	5.70	16.20	5.00
20x4.4	19.50	20.00	4.15	4.45	19.45	3.95
20x5.5	19.55	20.15	5.35	5.70	19.30	4.95
22x5.5	21.55	22.15	5.35	5.70	21.30	4.95
24x5.5	23.55	24.15	5.35	5.70	23.30	4.95
24x7.7	23.00	23.75	7.20	7.65	21.28	6.75
25x6.0	24.35	25.00	5.80	6.15	23.70	5.00
25x6.75	24.80	25.50	6.45	6.85	23.44	6.03
26x6.6	25.05	25.75	6.25	6.65	23.55	5.85
28x7.7	26.60	27.40	7.40	7.85	24.90	6.95
30x6.6	29.40	30.32	5.95	6.50	28.20	5.50
30x8.8	29.50	30.40	8.35	8.90	27.40	7.90
32x8.8	30.05	31.00	8.35	8.90	28.05	7.90
34x9.9	32.45	33.40	9.55	10.20	30.10	8.80
36x11	34.00	35.10	10.80	11.50	31.65	10.10
38x11	36.00	37.10	10.80	11.50	33.65	10.10
39x13	37.30	38.25	12.25	13.00	34.25	11.45
40x12	38.55	39.70	11.70	12.35	35.50	10.90
40x14	38.85	39.80	13.25	14.00	35.10	12.00
44x13	42.30	43.55	12.80	13.50	39.45	11.80
44x16	42.30	43.25	15.05	16.00	38.20	13.70
46x16	44.30	45.25	15.05	16.00	40.70	14.10
49x17	47.70	48.75	16.40	17.25	43.00	14.50
56x16	54.80	55.90	15.50	16.20	50.85	14.26
15x6.0-6	14.55	15.20	5.90	6.30	--	--

TABLE II. DIMENSIONS OF AIRCRAFT TIRES

Size	Outside Diameter		Section Width		Shoulder Diameter Maximum	Shoulder Width Maximum
	Minimum	Maximum	Minimum	Maximum		
17.5X6.25-11	17.30	17.70	5.70	6.10	--	--
18X5.7-8	17.30	17.90	5.35	5.70	16.20	5.00
18X6.5-8	17.45	18.00	6.20	6.50	15.95	5.70
21X7.25-10	20.60	21.25	6.80	7.20	19.75	6.35
22X6.6-10	21.60	22.20	6.40	6.80	--	--
22X6.75-10	21.35	22.00	6.35	6.75	19.85	5.95
22X7.25-11.5	21.75	22.34	7.00	7.43	--	--
22X8.5-11	21.40	22.00	8.10	8.50	19.65	7.50
24X6.5-14	23.60	24.20	6.25	6.65	22.40	5.90
24X8.0-13	23.40	24.00	7.55	8.00	22.00	7.05
25.5X8.0-14	24.80	25.50	7.55	8.00	23.14	6.84
26X7.75-13	25.50	26.30	7.45	7.90	23.90	6.95
26X8.0-14	25.30	26.00	7.50	8.00	23.85	6.00
26X8.75-11	25.75	26.55	8.45	8.95	23.75	7.90
28X9.0-12	26.80	27.60	8.35	8.85	24.80	7.80
28X9.0-14	27.30	27.85	8.60	9.10	25.25	8.00
29X11.00-10	28.10	29.00	10.40	11.00	25.60	9.35
30X11.5-14.5*	--	31.00	--	11.85	27.54	10.40
31X11.5-16	30.20	31.00	10.80	11.50	28.30	10.10
34.5X7.75-18	33.70	34.50	9.15	9.75	31.55	8.40
37X11.5-16	36.10	37.00	10.90	11.50	33.20	10.10
47X18-18	46.00	46.90	17.25	17.90	41.60	15.75

* Maximum thrown and grown dimensions.

TABLE III
BEAD SEATING PRESSURES

Normal Rated Inflation Pressure (Psi)	Minimum Bead Seat Pressure (Psi)	Maximum Bead Seat Pressure (Psi)
40 or less	25	40
40 to 100	25	*
Over 100	50	*

*In no case shall the maximum bead set pressure exceed either the rated tire inflation pressure or 200 psi, whichever is the lesser.

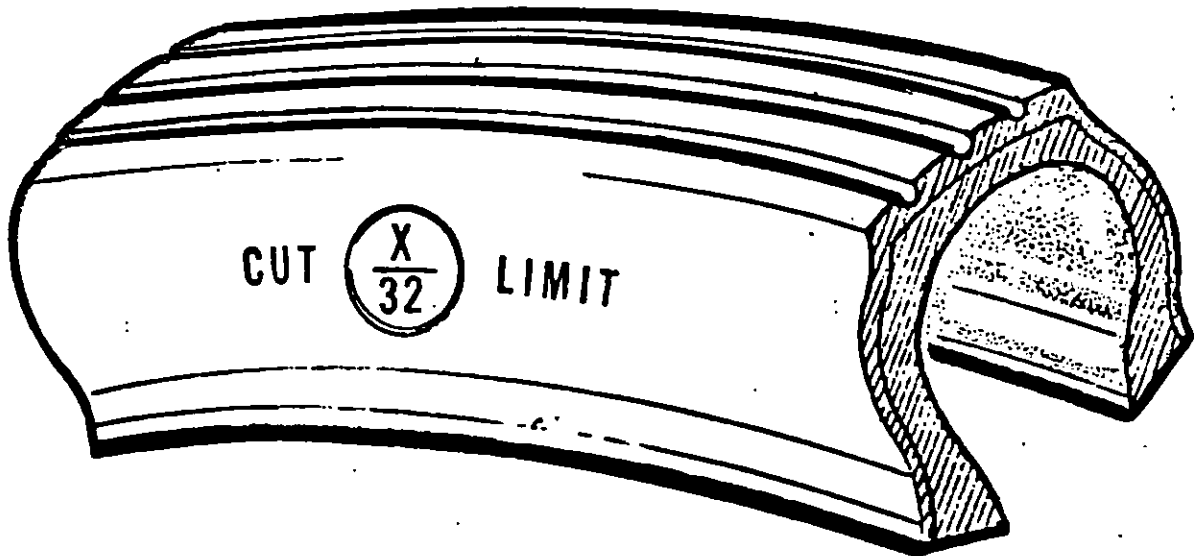


FIGURE 1. Cut Limit Identification

DATE _____
QTR No. _____

MANUFACTURER _____
AIRCRAFT TIRE
QUALIFICATION TEST REPORT

Size _____ No. Plies _____ Cord Material _____
Ply Rating _____ Approved Low Temperature No. _____

Item		Requirements	Qualification Results
(A)	Balance	_____ in. oz	_____ in. oz
(B)	Bead seating Pressure	max _____ psi	_____ psi
		min _____ psi	_____ psi
(C)	Bead width	max _____ inch	_____ inch
(D)	Burst pressure	min _____ psi	_____ psi
(E)	Loaded Radius	nominal _____ inch	_____ inch
	Tolerance @ Rated Load & Pressure	_____ inch	_____ inch
(F)	Dimensions*		
	A	max _____ inch min _____ inch	_____ inch
	B	max _____ inch min _____ inch	_____ inch
	C	max _____ inch min _____ inch	_____ inch
	D	max _____ inch min _____ inch	_____ inch
	*Refer to Table II.		
(G)	Mold skid depth	min _____ inch	_____ inch
(H)	Total tread thickness	min _____ inch	_____ inch
	(1.3 x Actual mold skid depth)		
(I)	Weight	max _____ lbs	_____ lbs
		calculated max weight _____ lbs	_____ lbs
(J)	Dynamic test result (see figure 3)		
(K)	Air retention (tubeless)	max loss _____ %	_____ %
(L)	Strength of union		
		Between sidewall & plies (as determined)	_____ lbs
		Between tread & d plies (as determined)	_____ lbs
		Between top 3rd 4th carcass plies (as determined)	_____ lbs
		(for tires rated 200 mph and above)	
(M)	Number of wires per bead bundle (as determined)		1st
			2nd
			3rd
			4th

FIGURE 2. General Format of Qualification Test Report
(Sheet 1 of 2)

MIL-T-5041H

ITEM	REQUIREMENTS	QUALIFICATION RESULTS
(N) Chafing strips	(as determined)	_____
(O) Bead tie-in:		_____
	Heel ply turnups (as determined)	_____
	Toe ply turnups (as determined)	_____
	Flippers/bead bundle (as determined)	_____
(P) Min tensile of cord	(as determined)	_____
(Q) Cord count in crown	(as determined)	_____
	(measured at 90 degrees angle to cord path)	_____
(R) Total crown thickness	(as determined)	_____
(S) Number of breaker plies	(as determined)	_____
(T) Number of tread reinforcing plies	(as determined)	_____
(U) Sidewall vents per side	(as determined)	_____
(V) Durometer hardness	(as determined)	_____
	(shore-rubber tread only)	_____
(W) Balance pad adhesion	Min-8 lb tubeless	_____
	Min-1 1/2 lb tubetype	_____

The term "as determined" as used in this table denotes that the value shall be determined and reported even though requirements are not specified for such values. Minimum acceptable values are to be shown for tires to be manufactured under quality assurance requirements of 4.4.2.1.

FIGURE 2. General Format of Qualification Test Report
(Sheet 2 of 2)

AIRCRAFT TIRE
QUALIFICATION TEST REPORT

MANUFACTURER _____ QTR NO. _____
DATE _____

Test completion date _____ Test specifications _____ Size, ply rating _____ Serial number _____ Tire weight (actual) _____		
DIMENSIONS Rated inflation _____ psi Outside diameter _____ in. _____ Cross section _____ in. _____ Shoulder width dimension _____ in. _____	After 12 Hrs Minimum	Remarks
Load radius _____ in. _____	Break-in Before After	curved surface inflation before break-in
Bead seat pressure _____ psi _____		
HIGH SPEED TAKEOFF Flywheel OD _____ in. _____ Test Inflation _____ psi _____ Acceleration _____ ft/sec ² _____ Speed range _____ mph _____	Taxi Takeoff	
Taxi time _____ sec _____ Time programmed T.O. _____ sec _____ Load range _____ lb. _____ Avg start and peak contained Air Or Carc Temp _____ F deg. _____ Number of takeoffs _____		
HIGH SPEED LANDING Flywheel OD _____ in. _____ Test inflation _____ psi _____ Deceleration rate _____ ft/sec ² _____ Speed range _____ mph _____	Landing Taxi	

FIGURE 3. General Format of Qualification Test Report
(Sheet 1 of 2)

MIL-T-5041H

Time programmed _____ sec _____		
Taxi time _____ sec _____		
Load range _____ lb _____		
Start and avg peak:		
AirOrCarc temp _____ °F _____		
Number of landings _____		
CAMBER TAXI OR MIL-T-5041 TESTS	Landing	Taxi
Flywheel OD _____ in. _____		
Tire load _____ lb. _____		
Test inflation _____ psi _____		
Speed range _____ mph _____		
Distance _____ ft _____		
KE (MIL-T-5041 test only) ft-lb _____		
Avg start and avg temp:		
Contained air _____ °F _____		
or carcass _____ °F _____		
IE (MIL-T-5041 test only) lb _____		
Number of cycles _____		
TEST RESULTS		

REMARKS: Any blemishes as described in 4.5.7.3 through 4.5.7.3.4 shall be reported in "Remarks" column opposite the test condition where blemish was first noticed. (Include a description of the condition of the tire assembly after each test stage and at completion of tests).

FIGURE 3. General Format of Qualification Test Report
(sheet 2 of 2)

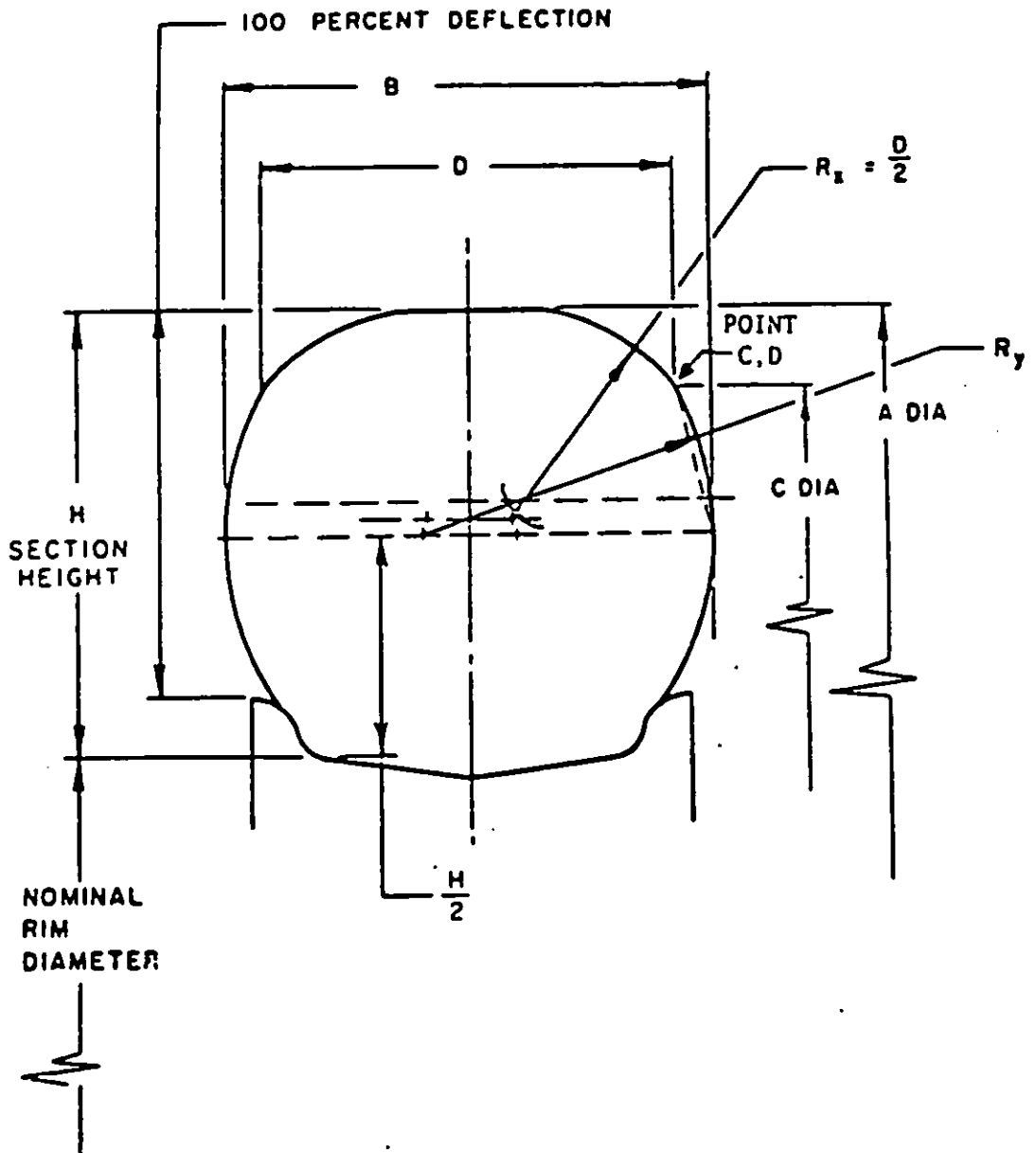


FIGURE 4. Dimensions of Aircraft Tires

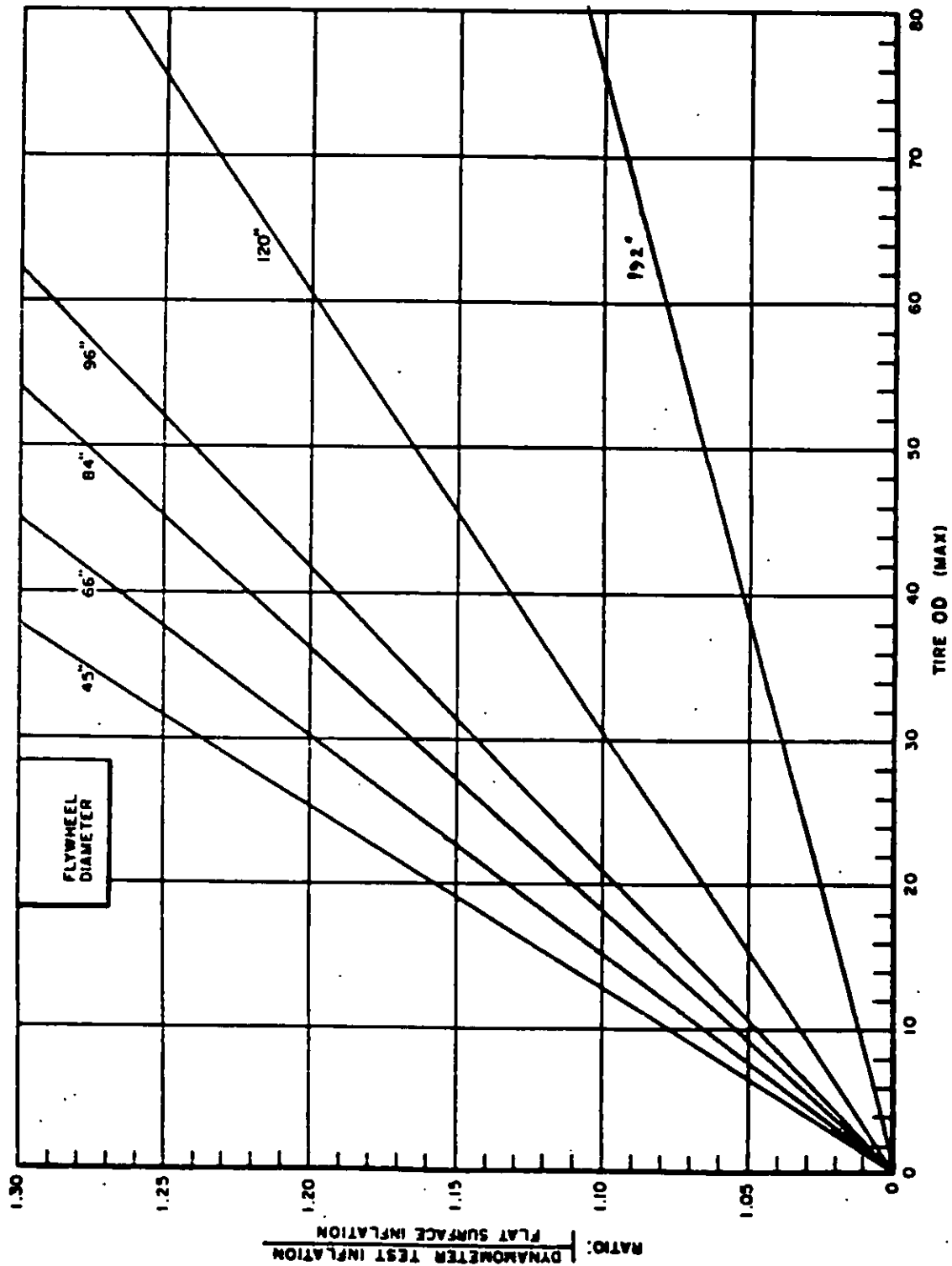


FIGURE 5. Chart for Adjusting Aircraft Tire Test Inflation Pressures for Flywheel Curvature